

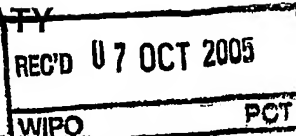
## PATENT COOPERATION TREATY



PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 62750A	<b>FOR FURTHER ACTION</b> See Form PCT/PEA/416	
International application No. PCT/US2004/034327	International filing date (day/month/year) 19.10.2004	Priority date (day/month/year) 21.10.2003
International Patent Classification (IPC) or national classification and IPC C08G61/10		
Applicant DOW GLOBAL TECHNOLOGIES INC.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand  11.08.2005	Date of completion of this report  06.10.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Seelmann, M  Telephone No. +49 89 2399- 	

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/034327

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-32 as originally filed

**Claims, Numbers**

1-7 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify)*:
  - ☐ any table(s) related to sequence listing *(specify)*:
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify)*:
  - ☐ any table(s) related to sequence listing *(specify)*:

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/034327

**Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 1(part)-3(part),5(part)-7(part)

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☒ the claims, or said claims Nos. 1(part)-3(part),5(part)-7(part) are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. :

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

**INTERNATIONAL PRELIMINARY REPORT  
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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes: Claims	1(part)-3(part),4,5(part)-7(part)
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1(part)-3(part),4,5(part)-7(part)
Industrial applicability (IA)	Yes: Claims	1(part)-3(part),4,5(part)-7(part)
	No: Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/US2004/034327

- D1** US 5 965 679  
**D2** WO 03/068825  
**D3** US 6 172 128 cited in the present application

**Item III**

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The present claim 1 relates to a compound defined by reference to a desirable property namely A and C' functional groups are able to react with B-functional group to produce a cross-linked polyphenylene polymer. This claim covers all compounds having this characteristic property, whereas the application provides support within the meaning of article 6 PCT or disclosure within the meaning of article 5 PCT for only a very limited number of such compounds, exactly a single one (cf. example 1).
2. Claim 1 does not meet the requirements of Art.6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem, production of a cross-linked polymer.
3. As regard to the subject-matter of claims 2 and 3, it relates to an extremely large number of possible monomers. Support within the meaning of article 6 PCT and disclosure within the meaning of article 5 PCT is to be found, however, for only a very small proportion of the compounds claimed, only one monomer in example 1.

**Item V**

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

**1. Novelty (Art.33(2) PCT)**

**D1** discloses monomers containing one cyclopentadienone group together with two aromatic acetylene groups and polymers made from such monomers (table I, compounds A, B, D-F, col.37-40). The manufacture of crosslinked materials is obtained therein by

reacting polyfunctional compounds having two or more cyclopentadienone groups with polyfunctional compounds having two or more aromatic acetylene groups, at least some of the polyfunctional compounds having three or more reactive groups.

In **D2**, monomers containing at least two cyclopentadienone groups together with at least two phenylacetylene groups are listed under Formulae II to XXVII (pages 7-16; examples 1-5, 18, 22, 24, 38) obtained by cycloaddition between A- and B-functional groups. These are reacted with a cross-linked polystyrene poragen to produce a porous matrix (examples 32-37).

**D3** describes crosslinked polymers by reacting polymers containing cyclopentadienone groups with other polymers containing phenylacetylene groups (figures 3, 4, 11 and 13).

Crosslinked or crosslinkable polyarylenes that are stable at high temperatures and have good electrical insulative properties have been taught for use in the manufacture of microelectronic devices, for instance in **D1-D3**.

## 2. Inventive step (Art.33(3) PCT)

The closest related monomers are known from **D2** and differ from the ones of claim 4 in that they do not contain open acetylene moieties:  $\text{HC}\equiv\text{C}-$ . This document teaches that the selection of poragens combined with monomeric precursors of organic polymers, such as poly(arylene) or poly(arylenether) enables to produce matrix materials with very small pore sizes. The technical problem posed in the present demand is to look for other suitable monomeric precursors in this respect. The proposed solution are the monomers listed in claim 1, i.e. the incorporation of C' groups in the monomers known from **D1** or **D2**. No inventive step can be recognized for the subject-matters of claims 1 to 7 for the following reasons:

- 2.1 In the present application on page 24, lines 20-24 it is written that this incorporation provides an improvement over **D2** in that the monomers containing A, B and C' functional groups possess an enhanced rate of crosslinking at lower temperatures (pages 24-25). Only one single monomer  $\text{A}_2\text{B}_2\text{C}_2'$  has been prepared, b-staged and cured (pages 28-32). DSC-analysis was performed. No experimental data were

provided about the flex storage modulus versus temperature in order to assess that the incorporation of the C'-functional group in the monomer renders the polymeric composition suitable for the production of porous matrix. Accordingly there is no proof that the proposed monomer solves the technical problem posed.

- 2.1 As discussed above, it has not been proven that the only single prepared monomer according to claim 1 does actually show the alleged properties (cf. example 1). Further definitions as described in claims 1 to 3 cannot be considered as a reasonable generalisation of this single example. The core of the application resides into the preparation of monomer and/or oligomer via the cycloaddition between a tetracyclone, acetylene and phenylacetylene (cf. claim 4). In the present case claims 1-4 so lack support, and the application so lacks disclosure that an inventive step over the whole of the claimed scope is impossible without providing further experimental evidence for the alleged effects.